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**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

CONFIRMATION NO. 4774

§ SERIAL NO.: 10/762,182  
§ ART UNIT: 3641  
§ APPLICANT: William T. Bell

§ FILING DATE: 01/21/2004  
§ EXAMINER: Chambers, Troy  
§ DOCKET NO.: Titan 002.1C

**TITLE: EXPLOSIVE PIPE SEVERING TOOL**

CUSTOMER NO. 37471

Mail Stop: APPEAL BRIEF - PATENTS  
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P.O. Box 1450  
Alexandria, Virginia 22313-1450

**TRANSMITTAL LETTER**

Dear Sir:

Responsive to the Examiner's Notification of Non-Compliant Appeal Brief (37 CFR 41.37), please find Appellant's AMENDED APPEAL BRIEF herewith.

The Examiner deemed Section (G) SUMMARY OF THE CLAIMED SUBJECT MATTER of the original Brief as failing to present a concise summary of the claimed subject matter. Although Appellant respectfully traverses the Examiner's finding, Appellant has revised the SECTION (G) format to restate, in full, each of the appealed claims with the included structural elements underlined. Following each claim restatement is a narrative of the claimed subject matter as required by the Rules. Following the narrative is a focused description of each structural element in the claim including the drawing reference character, page number and paragraph citations to justifications in the original specification text for the claimed structure.

Respectfully submitted,

W. Allen Marcontell  
Reg. No. 22,9250

October 16, 2008



**AMENDED**  
**APPEAL BRIEF**

**Application No.** 10/762,182

**Filing Date** 01/21/04

**Invention Title** EXPLOSIVE PIPE SEVERING TOOL

**Inventor** William T. Bell

**Examiner** Chambers, Troy

**Art Unit** 3641

**Confirmation No.** 4774

**Attorney Docket** Titan 002.1C

## **TABLE OF CONTENTS**

(C)	REAL PARTY IN INTEREST .....	Pg. 3
(D)	RELATED APPEALS AND INTERFERENCES .....	Pg. 4
(E)	STATUS OF CLAIMS .....	Pg. 5
(F)	STATUS OF AMENDMENTS .....	Pg. 6
(G)	SUMMARY OF CLAIMED SUBJECT MATTER .....	Pg. 7
(H)	GROUND OF REJECTION TO BE REVIEWED ON APPEAL ---	Pg. 15
(I)	ARGUMENT .....	Pg. 17
(J)	CLAIMS APPENDIX .....	Pg. 28
(K)	EVIDENCE APPENDIX .....	Pg. 30
(L)	RELATED PROCEEDINGS APPENDIX .....	Pg. 31

**(C) REAL PARTY IN INTEREST**

The real party of interest in this proceeding is **TITAN Specialties, Ltd.**

## **(D) RELATED APPEALS AND INTERFERENCES**

The present application is a Continuation of application no. 09/949,990, now abandoned. U.S. Patent No. 6,959,765 has issued from a Division of said abandoned application no. 09/949,990. Application No's 11/442,807 and 11/442,899, filed 05/30/2006, are both Divisions of the present Application. Both Applications No's 11/442,807 and 11/442,899 are presently on appeal from respective Final Rejections.

Other than the above identified appeals, no other judicial proceedings or interferences are known to Appellant which may be related to, directly affect or be directly affected by or have a bearing on the Board's decision in the present appeal. As used herein, "appellant" includes the appellant of record, the appellant's legal representative and the assignee.

**(E) STATUS OF CLAIMS**

33 claims have been filed during the course of prosecution.

Claims 1 – 20 and 27 – 33 have been canceled.

Claims 21 – 26 have been finally rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,397,752 to W. Yang et al in view of U.S. Patent No. 5,431,104 to J.M. Barker

The Final Rejection of claims 21 – 26 is appealed.

**(F) STATUS OF AMENDMENTS**

All amendments proffered have been entered.



## **(G) SUMMARY OF CLAIMED SUBJECT MATTER**

Claim 21 is the only independent claim involved in this appeal.

### **CONCISE EXPLANATION OF *INDEPENDENT CLAIM 21* SUBJECT MATTER**

Claim 21 reads as follows:

An apparatus for explosively severing a length of pipe, said apparatus comprising:

- (a) a tubular housing having an internal barrel space for receiving an axial column of explosive material between a resiliently biased detonator housing at one end of said tubular housing and a selectively removable end plug at an opposite end of said tubular housing;
- (b) a first electrically initiated detonator positioned in said detonator housing and disposed to bear upon one end of said column of explosive material by said detonator housing bias;
- (c) a second electrically initiated detonator positioned in said removable end plug and disposed to bear upon an opposite end of said column of explosive;
- (d) a capacitive firing cartridge within said tubular housing; and,
- (e) electrical conduits connecting said capacitive firing cartridge with said first and second detonators whereby said removable end plug may be detached from said tubular housing without disconnecting electrical continuity between said capacitive firing cartridge and said detonators.

In essence, claim 21 describes an apparatus for explosively severing a length of pipe. The apparatus comprises a tubular housing having a selectively removable end plug at one end.. The housing encloses an internal barrel space for receiving a column of explosive material between a resiliently biased

detonator housing and the removable end plug. A first electrically initiated detonator is positioned in the detonator housing at one end of the barrel space. A second electrically initiated detonator is positioned in the removable end plug at the other end of the barrel space. Also within the tubular housing is a capacitive firing cartridge connected to the detonators with sufficient conduit to permit removal of the end plug from the tubular housing without disconnecting electrical continuity between the capacitive firing cartridge and the detonators.

The independent structural elements of claim 21 are underlined above for emphasis. Supporting disclosure of these elements is found by reference to the drawing and original specification as follows:

“a tubular housing”: drawing element **12** described verbatim at specification page 8, paragraph **[0021]**, lines 1 and 2.

“an internal barrel space”: drawing element **14** described verbatim at specification page 14, original claim 6, article (a).

“an axial column of explosive material”: drawing element **74** described verbatim at specification page 14, original claim 6, article (a).

“a resiliently biased detonator housing”: drawing element **28** described at specification page 8, paragraph **[0022]**, line 4 as “the upper detonator housing”

linked by “a coil spring **30**”. *Resilient bias* is an inherent property of a coil spring. The property of *resilient bias* is specifically related to the upper detonator housing **28** at specification page 14, original claim 6, article (c) as “resilient bias means for resiliently translating at least one socket housing.”

“a selectively removable end plug”: drawing element **40** described at specification page 9, paragraph **[0024]**, line 2 as a “nose plug” that operatively opens and closes the lower end of the housing tube **12**. The element **40** is further described at specification page 14, original claim 8 as “a closure means that is *selectively removed* from said tubular housing.”

“a first electrically initiated detonator”: drawing element **32** described at specification page 8, paragraph **[022]**, lines 5-9. as an “exploding bridge wire (EBW) detonator or exploding foil initiator (EFI) **32**” as seated within the upper detonator housing **28**. The “electrically initiated” characteristic of this detonator **66** is described verbatim by original claim 1, line 6, page 13, as “electrically initiated detonation means.”

“a second electrically initiated detonator”: drawing element **66** described at specification page, paragraph **[0024]**, line 6 as a “detonator cap **66**” in “receptacle socket **50**” of “nose plug **40**”. The electrically initiated characteristic of this detonator **32** is described verbatim by original claim 1, line 6, page 13, as “electrically initiated detonation means.”

“a capacitive firing cartridge”: drawing element **26** described verbatim at specification page 8, paragraph **[0022]**, line 3.

“electrical conduits”: drawing elements **34** described verbatim at specification page 8, paragraph **[0022]**, line 7.

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**CONCISE EXPLANATION OF *DEPENDENT CLAIM 22* SUBJECT MATTER**

Dependent claim 22 reads as follows:

An apparatus as described by claim 21 wherein said axial column of explosive is unitized about a substantially central rod structure having a length greater than said axial column of explosive.

Dependent claim 22 is a *structural* description of the axial column of explosive referenced in element (a) of dependent claim 21 as unitized about a central rod that has a greater length than the column of explosive.

The single structural element of claim 22 *additional* to those of independent claim 21 is underlined above for emphasis. Supporting disclosure of this element is found by reference to the drawing and original specification as follows:

“a substantially central rod structure”: drawing element **70** described at specification page 10, paragraph **[0028]**, lines 9 and 10 where “the pellets are

assembled as a serial column over the *rod 70* which penetrates the pellet *center bore*.”

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**CONCISE EXPLANATION OF *DEPENDENT CLAIM 23* SUBJECT MATTER**

Dependent claim 23 reads as follows:

An apparatus as described by claim 21 wherein said end plug is selectively removable from said tubular housing to load a column of explosive material into said internal barrel space.

Dependent claim 23 positively describes the selectively removable end plug referenced in element (a) of claim 21 as removed from the tubular housing to load the column of explosive material.

There are no structural elements described by claim 23 *additional* to those previously described by independent claim 21.

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**CONCISE EXPLANATION OF *DEPENDENT CLAIM 24* SUBJECT MATTER**

Dependent claim 24 reads as follows:

An apparatus as described by claim 23 wherein said end plug further includes an aperture for receiving a length of said central rod structure greater than a length of said axial column of explosive.

Dependent claim 24 expands the *structural* description of the end plug beyond claim 23 as having an aperture for receiving that length of the central rod that is greater than the axial length of the explosive column.

The single structural element of claim 24 *additional* to those of dependent claim 23 and independent claim 21 is underlined above for emphasis. Supporting disclosure of this element is found by reference to the drawing and original specification as follows:

“an aperture”: drawing element **48** described at specification page 11, paragraph [0031], line 3 as a “guide bore”. “The rod end projection **79** penetrates the guide bore **48** as the plug base **42** is pushed to an internal seal with the housing bore **14**.” The “guide bore” **48** is described verbatim by original claim 9, specification page 14, as a “guide *aperture* for aligning said explosive material within said internal barrel.”

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#### CONCISE EXPLANATION OF **DEPENDENT CLAIM 25** SUBJECT MATTER

Dependent claim 25 reads as follows:

An apparatus as described by claim 21 wherein said detonator housing is resiliently biased by a spring within said tubular housing to compressively confine said column of explosive material between said detonator housing and said removable end plug.

Dependent claim 25 expands the *structural* description of the detonator housing as resiliently biased by a spring to compressively confine the explosive column between the detonator housing and the end plug.

The single structural element of claim 25 *additional* to those of independent claim 21 is underlined above for emphasis. Supporting disclosure of this element is found by reference to the drawing and original specification as follows:

“a spring”: drawing element **30** described verbatim at specification page 8, paragraph **[0022]**, line 4 as linking the “upper detonator housing **28** to the inner housing tube **24**.”

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#### CONCISE EXPLANATION OF *DEPENDENT CLAIM 26* SUBJECT MATTER

Dependent claim 26 reads as follows:

An apparatus as described by claim 22 wherein said axial column of explosive material comprises a plurality of high explosive pellets aligned about said central rod structure.

Dependent claim 26 expands the claim 22 description of the central rod structure and column of explosive as comprising a plurality of high explosive pellets.

The single structural element of claim 26 *additional* to those of dependent claim 22 and independent claim 21 is underlined above for emphasis.

Supporting disclosure of this element is found by reference to the drawing and original specification as follows:

“a plurality of high explosive pellets”: drawing elements 74 described verbatim by original claim 1, line 3, at specification page 13.

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## **(H) GROUND OF REJECTION TO BE REVIEWED ON APPEAL**

The central issue to be reviewed on appeal is whether claims 21 – 26 are unpatentable under 35 USC §103(a) as obvious from the disclosure of U.S. Patent No. 6,397,752 to W. Yang et al in view of U.S. Patent No.5,431,104 to J.M. Barker.

In the Examiner's view, Yang et al discloses an apparatus suitable for explosively "severing" a length of pipe. By the Examiner's interpretation, the Yang et al apparatus comprises an explosive adapter 20 that includes a detonating socket housing 150, tubular housings 18A, 18B connected by adapter 20 and a spring. According to the Examiner, one or more of the adapters 20 may be used in series, therefore, opposite ends of either housing 18A or 18B will have the same configuration. The Examiner admits that Yang et al does not appear to disclose the use of a capacitive firing cartridge within the housing. To this failing, the Examiner relies upon the teachings of Barker which discloses use of an exploding foil initiator (EFI) for initiating the detonation of wellbore explosives. The Examiner perceives a substitution of the Barker EFI for the "explosive apparatus" of Yang et al to be obvious to one of ordinary skill in the art.

In response to Appellant's arguments, the Examiner has concluded that the "space" described by claim 21 between the detonator housing and the end plug for receiving a column of explosive has no definitional or limitation value. According to the Examiner, "it is irrelevant what the space is to be used for." Moreover, the intended use of the invention as stated in the claim 21

preamble is also “irrelevant.” The claim 21 descriptions of the detonators as being “electrically initiated” are dismissed as “not structural limitations.”

Although the rejection encompasses Appellant’s dependent claims 22-26, the structural limitations of those claims are not specifically addressed.

## (I) ARGUMENT

Guidelines for the determination of 35 USC §103(a) "obviousness" rejections are set forth by the U.S. Supreme Court decision in ***Wm. T. Graham et al v. John Deere Co.***, 383 U.S. 1, 86 S. Ct. 684, 15 L ed 2d 545 (Feb. 21, 1966).

"Under §103,

The scope and content of the prior art are to be determined;

Differences between the prior art and the claims at issue are to be ascertained; and

The level of ordinary skill in the pertinent art resolved."

*Graham et al v. John Deere*, 15 L ed 2d 545, 556.

### SCOPE AND CONTENT OF PRIOR ART

The **W. Yang et al** patent discloses a coupling apparatus 20 for joining a succession of perforating gun carriers 18. The coupling apparatus 20 of Yang et al connects one sequentially fired perforating gun carrier to another. The perforating charges described by Yang et al are detonated serially by a detonating cord 130, 136 i.e. fuse. See Yang et al column 6, line 62 through column 7, line 7.

The distinctive feature of the Yang et al coupling 20 is an apparatus for transferring detonation energy from the detonation cord 130 in gun carrier 18A to the detonation cord 136 in gun carrier 18B. When the detonation wave in detonation cord 130 arrives at the end of the gun carrier 18A, after having serially detonated all of the numerous perforating charges in carrier 18A, the donor booster explosive 132 is detonated to drive the flying plate 146 across the gap

144. Impact by the flying plate 146 detonates the receptor booster explosive 134 to initiate a detonation wave along detonation cord 136. Consequently, as the detonation wave progresses along the detonation cord 136, all of the perforation charges in gun carrier 18B are serially detonated. See Yang et al column 4, line 63 through column 5, line 12.

The **J. M. Barker** patent describes an electrically initiated explosive detonator that is energized by a capacitive discharge firing unit. Barker specifically addresses his invention to well perforating gun assemblies. The Barker detonator comprises a metallic foil bridge<sup>14</sup> in electric circuit with a high voltage capacitive discharge unit. In tight, juxtaposed assembly with the foil bridge 14 is a flyer disc layer 15, a barrel disc 16 and secondary explosive pellet 17. The flyer disc layer 15 is a proprietary plastic sheet material. The barrel disc 16 is a "hard plastic or ceramic" material having a central bore aperture 16a.

When the capacitor unit discharges a high voltage surge across the foil bridge 14, the bridge material is vaporized to generate a high pressure fluid force against flyer disc layer 15. Such high pressure force against the layer 15 in the barrel bore region 16a of the barrel disc cuts a small disc section of the plastic layer 15 and drives it sharply against the secondary explosive pellet 17. The shock of the flying disc impact detonates the secondary explosive 17 which, in turn, initiates a detonation wave along a detonation cord.

#### **DIFFERENCES BETWEEN CLAIMS AND PRIOR ART**

On its face, the Yang et al reference is a tool for **perforating** wells. The term "perforate" is defined by Webster's New World Dictionary as "to make a hole or holes through as by punching or boring; pierce; penetrate". Appellant's claimed invention is for a tool that explosively **severs** pipe. Webster's New World Dictionary defines "sever" as "to separate; make or become distinct; divide: to part or break off, as by cutting or with force; cut in two."

While shaped charge perforating guns and explosive cutting (severing) tools both rely upon directed explosive energy, the respective operational principles are distinct. The perforating gun disclosed by Yang et al has numerous explosive charges, each detonated independently of the others to discharge in a single line; usually radially from the gun axis. Appellant's pipe severing tool has a single column of explosive detonated simultaneously at opposite ends to create two, oppositely directed, explosion wave fronts. Collision of these two wave fronts vectors a radially expanding plane of extremely high temperature and pressure cutting fluid.

The structure and structural relationships of Appellant's pipe severing tool are, by independent claim 21, claimed to include "a tubular housing having an internal barrel space ... between a resiliently biased detonator housing at one end ... and a selectively removable end plug at an opposite end." While it may be patentably irrelevant to the Examiner what this "space" is used for, the structural presence of the space is not. "Space" in Appellant's claim 21 is a structural element.

The tubular housing 104 of a Yang et al gun carrier 18 may be fairly characterized as “having an internal barrel space”. Similarly, the receptor module 150 of Yang et al may be fairly characterized as “a resiliently biased detonator housing at one end” of the barrel space. Further, the adapter housing 102 of Yang et al, which physically joins one gun carrier 18A to another 18B by threaded (screwed) assembly, may be characterized as a “selectively removable end plug at an opposite end of said tubular housing.” Since the “internal barrel space” of Appellant’s claim 1 is structurally delineated between the “detonator housing at one end” and the “removable end plug at the other”, the “internal barrel space” of Yang et al must necessarily be interpreted as that space within the Yang et al housing 104 between a respective receptor module 150 at one end of the housing 104 and the respective adapter housing 102 at the other end of the housing 104.

Appellant’s claim 1 next describes “a first electrically initiated detonator positioned in said detonator housing” and “a second electrically initiated detonator positioned in said removable end plug.” The Yang et al perforating gun has no electrically initiated detonators. The Yang et al donor booster explosive 132 is fuse ignited by detonating cord 130 and the Yang et al receptor booster explosive 134 is impact ignited. Sequential ignition of both Yang et al boosters 132 and 134 is essential to transfer of the perforation detonation wave in detonation chord 130 to detonation cord 136.

The rejection dismisses the “electrically initiated” description of the detonators as being functional and not limiting. Respectfully, Appellant submits

that in the context of explosive detonators being structurally differentiated by those of ordinary skill in the art as fuse (thermally), impact (shock) or electrically (EFI or EBW) initiated, such distinguishing adjectives are as structural as “electric” motor, “diesel” motor and “gasoline” motor.

At this point, the rejection rationale poses the premise that substitution of a Barker EFI (electrical) initiator for the fused and impact initiators 132 and 134 of Yang et al would be obvious to one of ordinary skill in the art. **Evidently, it has not been appreciated that such an “obvious” substitution of the Barker apparatus for corresponding Yang et al apparatus would eliminate one of the electrically initiated detonators that delineate the Yang et al barrel space in the Examiner’s hypothetical combination.**

The Barker foil bridge 14 may serve as an obvious substitute for the Yang et al donor booster 132. The Barker secondary explosive initiation pellet 17 may serve as an obvious substitute for the Yang et al receptor booster 134. The flyer cut from the disc 15 of Barker serves exactly the same purpose as the “flying plate” 146 of Yang et al. However, the foil bridge 14 and explosive pellet 17 of Barker are necessarily unitized as single operative unit to initiate a detonation wave in a detonation cord. See Barker column 1, lines 25 and 26. Ergo, by an obvious substitution, one Barker EFI unit would replace both Yang boosters 132 and 136 respective to a single perforating gun. Logically, that substitution would be physically placed in the Yang et al receptor module 150 since Yang et al has taught that initiation of the detonation cord 136 should begin at that end of the

gun carrier 18B. Hence, there would be no detonator or booster in the “end plug” 102.

Quite obviously, this arrangement may be reversed to place the Barker EFI detonator unit in the “end plug” 102. Resultantly, however, there would be no detonator in the module 150. **Either case of “obvious” substitution of the Barker EFI unit for equivalent Yang et al structure would eliminate a detonator at one end of the Yang et al housing barrel space or the other.**

**There is no teaching, suggestion, motivation or logical reason for initiating a perforating gun detonation chord at both ends, simultaneously.** Similarly, there is no prior art structure or obvious combination of structure as defined by Appellant’s claim 21 for accomplishing such a function.

Appellant’s dependent claim 22 gives a structural description of a column of explosive that is unitized about a central rod wherein the rod is longer than the explosive column. Admittedly, the parent claim 21 reference to a tubular housing having an internal barrel space “for receiving an axial column of explosive material” does not positively describe the structural presence of a “column of explosive material” within the barrel space. Since a fundamental invention objective is to unitize the explosive independently of the prewired electric detonators, it is important to Applicant’s scope of invention protection to have a claim to the apparatus that is adapted to receive the explosive: independently of the explosive presence in the apparatus. However, the claim 22 description of certain characteristics and properties of the explosive column unit necessarily imputes compatibly corresponding structure to the claim 21 elements. Neither



Yang et al nor Barker disclose unitized explosives even remotely corresponding to the description of claim 22.

Dependent claim 24 expands on the end plug structure of claim 21 by including an aperture in the end plug for receiving a length portion of the claim 23 central rod that is greater than the explosive column length. Since there is no explosive unifying rod disclosed by either Yang et al or Barker there could be no teaching or suggestion by the prior art to accommodate such a rod portion by the Yang et al “end plug”<sup>102</sup>.

Dependent claim 26 expands the structural description of the claim 22 explosive column as comprising a plurality of pellets aligned about the central rod structure.

#### **LEVEL OF SKILL IN THE ART**

The industrial art to which the present invention relates is highly complex and inherently dangerous. Moreover, relevant disciplines of the art are taught by few if any academic institutions. It is truly learned as an “industrial art.” The principles and disciplines of using industrial explosives have evolved from past human tragedies and monumentally expensive failures. Moreover, regulations mandated by both government safety orders and insurance dictated industry practices highly restrict the latitude of innovation and experimentation. Once a practice or procedure is accepted by the industry as practical and safe, there is little motivation to change.

## THE LAW

Since the advent of *Graham et al v. John Deere* in 1966, the Court has recently restated the *Graham et al v. John Deere* guidelines in their decision on ***KSR International v. Teleflex, Inc.***, 550 U.S. \_\_\_\_\_ (2007), 127 S. Ct. 1740 (April 30, 2007). While the KSR Court dismissed a rigid application of the “teaching, suggestion, or motivation” test for 35 USC §103 “obviousness”, it simultaneously re-energized some of the older, traditional tests.

“For over a half century, the Court has held that a ‘patent for a combination which only unites old elements with **no change in their respective functions** ... obviously withdraws what is already known into the field of its monopoly and diminishes the resources available to skillful men’.” *Great Atlantic & Pacific Tea Co. v. Supermarket Equipment Corp.*, 340 U.S. 147, 152 (1950). *KSR International v. Teleflex, Inc.* 500 U.S. \_\_\_\_ (2007), Bench Opinion Pg. 11.

To further this theme, the KSR Court referenced *Sakraida v. AG Pro, Inc.*, 425 U.S. 273 (1976) to revive the “conclusion that when a patent

‘simply arranges old elements with each performing the **same function** it had been known to perform’ and yields no more than one would expect from such an arrangement, the combination is obvious.” *Id.*, at 282.”

From these specific references by the KSR court, it may be reasonably concluded that the law of reference reconstruction and redesign as articulated by *In re Ratti*, 270 F. 2d 810, 123 U.S.P.Q. 349 (CCPA 1959) remains as controlling authority.

“We hold, further, that the combination of (Primary Reference) with (Secondary Reference) is not a proper ground of rejection of the claims here on appeal. This suggested combination of references **would require a substantial reconstruction and redesign of the elements** shown in (Primary Reference) as well as a change in the basic principle under which the (Primary Reference) construction was designed to operate.” *In re Ratti*, 270 F.2d 810, 123 USPQ 349, 352.

The Examiner's 35 USC §103(a) rejection of Appellant's claims 21-26 requires a substantial reconstruction and redesign of the prior art elements. Moreover, the references actually teach away from Appellant's invention and away from each other.

Although the KSR Court has rejected a *rigid* application of a "teaching, suggestion, motivation" (TSM) test for 35 USC §103(a) "obviousness" (Id at page 15), the Court has also conceded the test to provide "helpful insights".

"There is no necessary inconsistency between the idea underlying the TSM test and the *Graham* analysis." Id. at page 15.

"Combining prior art references without evidence of such a suggestion, teaching or motivation simply takes the inventor's disclosure as a blueprint for piecing together the prior art to defeat patentability – the essence of hindsight." *In re Dembiczak*, 175 f. 3d 994, 999.

"Particular findings must be made as to the reason the skilled artisan, with no knowledge of the claimed invention, would have selected these components for combination in the manner claimed." *In re Kotzab*, 217 F.3d 1365,1371 (Fed. Cir. 2000).

"In other words, the examiner must show reasons that the skilled artisan, confronted with the same problems as the inventor and with no knowledge of the claimed invention, would select the elements from the cited prior art references for combination in the manner claimed". *In re Rouffet*, 149 F.3d 1350, 1357 (Fed. Cir. 1998).

While the KSR Court rejected the "rigorous" application of a TSM test, it simultaneously sanctified those prior expressions of law that prohibit a substantial reconstruction and redesign of selected elements of the prior art without an explicit analysis. Id. at page 14.

## **SUMMARY**

Without regard to use or application as described by the preamble of independent claim 21, the structure of claim 1 describes a tubular housing having an internal barrel space between a detonator housing at one end and a removable end plug at the other. An electrically initiated explosive detonator is in the detonator housing at one end of the barrel space and another electrically initiated explosive detonator is in the plug at the other end of the barrel space. A capacitive firing cartridge and conduits connecting the detonators are also in the tubular housing.

Yang et al disclose a fused detonator in a removable tube plug operatively associated with an impact detonator in a detonator housing. The fused detonator is initiated by a detonator cord in one tube and the impact detonator initiates a detonator cord in another tube. Each cord detonates perforating charges in a barrel space between the detonator housing and the removable plug.

Barker discloses a detonation assembly having an electrically initiated EFI unit to initiate an impact initiated detonator for initiating a detonation cord.

An obvious combination of the Barker detonation assembly with the Yang et al disclosure would substitute one Barker assembly for the collective combination of fused and impact detonators of Yang et al. Resultantly, there would be only one "electrically initiated" detonator in any particular tube of Yang et al whereas Applicant's claim 21 requires two.

There is no prior art for a column of explosive assembled about a rod that is longer than the explosive column as described by dependent claims 22-26.

In conclusion, Appellant respectfully requests the Honorable Board's reversal of the Examiner's rejection of claims 21-26 and an order of patent issue to Art Unit 3641

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'W. Allen Marcontell', with a long horizontal flourish extending to the right.

W. Allen Marcontell  
Reg. No. 22,925

October 16, 2008

## **(J) CLAIMS APPENDIX**

Claim 21. An apparatus for explosively severing a length of pipe, said apparatus comprising:

- (f) a tubular housing having an internal barrel space for receiving an axial column of explosive material between a resiliently biased detonator housing at one end of said tubular housing and a selectively removable end plug at an opposite end of said tubular housing;
- (g) a first electrically initiated detonator positioned in said detonator housing and disposed to bear upon one end of said column of explosive material by said detonator housing bias;
- (h) a second electrically initiated detonator positioned in said removable end plug and disposed to bear upon an opposite end of said column of explosive;
- (i) a capacitive firing cartridge within said tubular housing; and,
- (j) electrical conduits connecting said capacitive firing cartridge with said first and second detonators whereby said removable end plug may be detached from said tubular housing without disconnecting electrical continuity between said capacitive firing cartridge and said detonators.

Claim 22. An apparatus as described by claim 21 wherein said axial column of explosive is unitized about a substantially central rod structure having a length greater than said axial column of explosive.

Claim 23. An apparatus as described by claim 21 wherein said end plug is selectively removable from said tubular housing to load a column of explosive material into said internal barrel space.

Claim 24. An apparatus as described by claim 23 wherein said end plug further includes an aperture for receiving a length of said central rod structure greater than a length of said axial column of explosive.

Claim 25. An apparatus as described by claim 21 wherein said detonator housing is resiliently biased by a spring within said tubular housing to compressively confine said column of explosive material between said detonator housing and said removable end plug.

Claim 26. An apparatus as described by claim 22 wherein said axial column of explosive material comprises a plurality of high explosive pellets aligned about said central rod structure.

**(K) EVIDENCE APPENDIX**

None.



**(L) RELATED PROCEEDINGS APPENDIX**

None.